

## Naval War College Review

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Volume 60  
Number 3 *Summer*

Article 21

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2007

# The Survival Imperative: Using Space to Protect the Earth

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### Recommended Citation

Arpin, John R. (2007) "The Survival Imperative: Using Space to Protect the Earth," *Naval War College Review*: Vol. 60 : No. 3 , Article 21.

Available at: <https://digital-commons.usnwc.edu/nwc-review/vol60/iss3/21>

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at least a bit of airpower advocacy from a professor of history who teaches at the Air Force Academy. Gillespie's account is on the whole balanced and well documented, and his frank discussion of some of the less-than-favorable impacts of PGMs on national security policy makes it clear he is not a complete airpower zealot.

Nearly as valuable as the technology-policy linkage is the detailed and intimate look at the technology innovation process itself. Perhaps the best chapter is the author's account of the mid-1960s development of the Paveway laser-guided bomb. Gillespie makes it clear that this was not the work of an "individual inventive genius" but rather the product of a host of factors ranging from changes in national policy (i.e., "flexible response"), newly available supporting technologies (the laser and integrated circuit), an innovative engineering team from a minor defense contractor (Texas Instruments), and a persistent and bureaucratically adept Air Force colonel.

The biggest disappointment with this work is that despite its October 2006 release date, the most recent conflicts in Afghanistan and Iraq are treated almost as afterthoughts. There are PGM successes that could be amplified from these conflicts (e.g., the evolution of "urban close air support" and even the demise of the terrorist al-Zarqawi), and a fuller treatment would reinforce Gillespie's central contribution.

*Weapons of Choice* makes a good case that PGMs have indeed altered the American approach to war as "policy-makers have seized upon precision guided munitions as the key to more humane war." Gillespie makes clear this is not a wholly positive development,

because "an anemic, casualty-averse policy is unlikely to deter or defeat the determined, resourceful foe," and perhaps more importantly, because "winning and maintaining the peace" has proven much more difficult than destroying targets. While he could have made his argument even stronger, Paul Gillespie makes clear (with apologies to Abraham Maslow) that the mere presence of an elegant hammer could cause policy makers to overlook all but the nails. Iraq and Afghanistan may further reinforce Paul Gillespie's assertion that "technology best serves those who thoughtfully implement it."

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Burrows, William E. *The Survival Imperative: Using Space to Protect the Earth*. New York: Forge Books, 2006. 306pp. \$24.95

Nowadays we take for granted that space assets are necessary for military operations, but the nonmilitary use of space has also passed into the realm of the necessary. While the use of space assets, and thus access to space, is of vital importance to the nation, there is no watershed work that unites the political, economic, industrial, and military aspects into a single vision. Space policy, in other words, is still waiting for its Mahan.

If he is not quite Mahan, veteran space writer William E. Burrows lays a very good foundation for what could evolve into a national (or even international) policy—planetary protection. The author unites two major themes under this concept: protecting the earth from asteroid or comet strikes and monitoring the

global environment to ward off an ecological disaster.

Burrows provides an excellent summary of asteroid strikes, from the dinosaur killer to the 1908 Tunguska impact. But is he overstating the threat? Imagine Katrina on a global scale, or a nuclear power mistaking an asteroid for a nuclear attack and retaliating. A large enough strike could devastate the planet, and, without warning, we could do nothing to prevent it.

Burrows, who also wrote *Deep Black* (1988), argues that overhead reconnaissance systems represent the perfect tool for monitoring the global environment. He asserts that these types of assets can provide early warning of ecological devastation (such as deforestation and overfishing), enabling more effective protection of the environment.

Burrows makes a number of recommendations. He argues for expanded and continued support for ongoing efforts to monitor “near earth objects” and supports a U.S. interagency effort for monitoring the global environment. In the long term, he believes, establishing a human presence in space will be necessary. Unlike other visionaries (such as Gerard K. O’Neill and G. Harry Stine), Burrows declares that permanent human presence in space will follow an economic need, rather than the other way round. His wedge into space is building a data warehouse on the moon to preserve humanity’s cultural and technological heritage. On the moon its contents would be accessible to anyone on earth who could rig a relatively simple communications site.

The author also provides a superb political and social history of the space program, up to the present, and provides

critical insights on the political drivers for the space program.

Is Burrows’s premise farfetched? The 5 December 2006 edition of the *Washington Times* quoted the December issue of *Popular Mechanics* that on Friday, 13 April 2029, a twenty-five-million-ton asteroid will pass the earth less than twenty-one thousand miles away. At least, scientists claimed there was a 99.7 percent chance the asteroid will miss.

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Klein, John J. *Space Warfare: Strategy, Principles and Policy*. Space Power and Politics Series. New York: Routledge, 2006. 196pp. \$110

We are a nation inextricably linked to space. Every instrument of our national power—diplomatic, information, military, economic—relies to some degree on access to and unimpeded use of space. *Space Warfare: Strategy, Principles and Policy* uses this fact to illustrate its author’s point that despite an increasing reliance on space capabilities, the United States has yet to develop a comprehensive space-power theory. Klein has written extensively on space-power theory, and this book builds upon many of his previous works, addressing the need for a national space strategy that adequately links space operations with national interests.

Throughout *Space Warfare* Klein astutely draws numerous parallels with space as a medium of national power similar to those of air, land, and the sea as viewed and utilized by independent states. As space capabilities increase in importance in relation to national